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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/751,898	01/07/2004	Shosuke Endoh	247409US2	3795

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EXAMINER

MACARTHUR, SYLVIA

ART UNIT PAPER NUMBER

1763

DATE MAILED: 09/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/751,898

Applicant(s)

ENDOH ET AL.

Examiner

Sylvia R. MacArthur

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 10-12, 14, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Ma et al (US 6,554,954).

Ma et al teaches a conductive collar surrounding a semiconductor workpiece in a plasma chamber.

Regarding claims 1, 12, 14: The apparatus comprises a plasma processing chamber (abstract), a (metal is inherently conductive, see col. 3 lines 1-5) susceptor 22, an electrostatic chuck 26 a ring member 50, and a lower ring body 52

Regarding claims 10 and 19: The susceptor 22 comprises a conductive lower electrode according to col.2 lines 49-59. How the ring member 50 is formed is a process limitation and does not structurally limit the ring member of Ma et al. The ring member of Ma et al could have inherently been formed by thermal spraying.

Art Unit: 1763

Regarding claim 11: The lower ring body 52 of Ma et al could inherently perform the function of protecting the susceptor. Ma et al also references element 52 as a protective collar in col.4 lines 52-54.

3. Claims 1, 10-12, 14, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Koshiihi et al (US 5,919,332).

Regarding claims 1, 12, 14: Koshiihi et al teaches a plasma processing apparatus comprising a chamber, a susceptor 6, chuck 11, a ring member 62, and a lower ring 61, see Fig. 10.

Regarding claims 10 and 19: Product by process limitations how the ring was formed does not further limit the claim nor does it receive patentable weight.

Regarding claim 11: The lower ring body 61 of Koshiihi et al could inherently perform the function of protecting the susceptor as it is located closest to the wafer.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-8, 13, 15-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al or Koshiihi et al.

Art Unit: 1763

Claims 2-4, 13, and 15-17: The dimensions of the ring especially the thickness is related to the impedance according to the specification page 14.

The dimensions of the components of the plasma chamber especially the ring members and lower ring members are a matter of optimization. It is well settled in that the determination of optimum values of cause effective variables such as the dimensions of the ring and lower ring member is within the skill of one practicing in the art. In re Boesch, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to design the lower ring and the ring member to provide optimal thickness that would result in the optimal impedance to produce the optimal amount of plasma to process the wafer.

Claim 5-8 and 20 The substrate is not part of the apparatus and is seen as a matter of an intended use. Note that the inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims. In re Young, 75 F. 2d, 25 USPQ 69.

Furhtermore the prior art of Ma et al or Koshiihi et al fails to teach the thickness of the substrate as being related to the impedance

The motivation to provide the dimensions of Ma et al or Koshiihi et al within the ranges of claims 5-8 and 20 is to provide the optimal physical parameters of protection to the wafer for processing and provide the desired impedance.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the dimensions of the ring member within the ranges of claims 5-8a and 20 as a matter of optimization.

Art Unit: 1763

6. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al or Koshiihi et al in view of Tong et al (US 2004/0083975).

The teachings of Ma et al or Koshiihi et al were discussed above.

Ma et al or Koshiihi et al fail to teach the materials of construction as discussed in claims 9 and 18 of the claimed invention.

Tong et al teaches a hot edge ring 108 surrounding an electrostatic chuck wherein the chuck is made of such materials as SiC and silicon.

Tong et al teaches that the material of construction of the edge ring the degree of coupling through the plasma can be tailored to provide a desired localized "edge" etch rate at the outer portion of the substrate being processed, see [0026 of Tong et al].

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the ring of Ma et al or Koshiihi et al with the materials disclosed by Tong et al.

Conclusion

Response to Arguments

7. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection. The prior art of Ma et al and Koshiihi et al are introduced to teach a chuck on a susceptor and a lower ring body below the periphery of the substrate and the newly amended claims reflect.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


Art Unit: 1763


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the hours of 8:30 a.m. and 5 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ram Kackar
Acting SPE 1763
Primary Examiner


RAM N. KACKAR, P.E.
PRIMARY EXAMINER


SYLVIA R. MACARTHUR
Patent Examiner
Art Unit 1763

Application/Control Number: 10/751,898

Page 7

Art Unit: 1763

September 18, 2006